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10/050,518	01/18/2002	Masaaki Nanaumi	Q68110	7763

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EXAMINER	
MARTIN, ANGELA J	
ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/050,518	NANAUMI ET AL.	
	Examiner	Art Unit	
	Angela J. Martin	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-10,12 and 16-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4-10, 12, 16-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is responsive to the Amendment filed on January 9, 2006. The Applicant has amended claim 5 and added new claims 25-27. However, the rejection is made final for the following reasons of record.

Specification

1. The amendments filed on 6/7/2004 and 1/10/2005 are objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

In the amendment filed on 6/7/2004:

On page 6 of the specification, in the paragraph beginning at line 7, the insertion of the phrase "polymer electrolyte membrane in the" constitutes new matter.

On page 6 of the specification, in the paragraph beginning at line 10, insertion of the phrase "polymer electrolyte membrane in the" constitutes new matter.

In the paragraph bridging pages 8 and 9 of the specification, the insertion of the phrase "the polymer electrolyte membrane having" constitutes new matter.

On page 10 of the specification, in the paragraph beginning at line 10, the insertion of the phrase "the polymer electrolyte membrane in" constitutes new matter.

On page 30 of the specification, in the paragraph beginning at line 9, the insertion of the phrases "the polymer electrolyte membrane in" and "of a single cell" constitutes new matter.

On page 31 of the specification, in the paragraph beginning at line 8, insertion of the phrase "polymer electrolyte membrane in the" constitutes new matter.

In the amendment filed on 1/10/2005:

In the paragraph bridging pages 8 and 9 of the specification, the insertion of the phrase "in the membrane electrode" constitutes new matter.

Applicant is required to cancel the new matter in the reply to this Office Action.

2. The disclosure is objected to because of the following informalities:

It is unclear to the Examiner what the Q value means since there appears to be contradictions throughout the specification and it is a term not known to one of ordinary skill in the art to characterize a polymer electrolyte membrane or a membrane electrode assembly by a Q value.

In paragraph 39 of the specification, applicants states that:

"...the polymer electrolyte membrane should have a Q value (charge per a unit area) of 0.09-0.18 C/cm^2...Here, the Q value is the amount of electric charge per a unit area determined from a peak area of proton on an adsorption side in the scanning of voltage from -0.1 V to +0.7 V, in a cell in which the amount of platinum in the catalytic layer of each electrode is 0.5 mg/cm^2, and in which a polymer electrolyte membrane electrode assembly is surrounded by an aqueous sulfuric acid solution of pH 1 on one side and a nitrogen gas on the other side. The Q value may be regarded as all indicator of adhesion of the electrode to the polymer electrolyte membrane, and it has been found that with the Q value of 0.09-0.18 C/cm^2, an excellent polymer electrolyte membrane electrode assembly is obtained. "

As seen in paragraph 39, the Q value limits each of the electrode to have a catalyst

loading of 0.5 mg/cm^2 by definition. It also appears to be a contradiction of what the Q value is since it states the polymer electrolyte membrane should have a certain Q value and at the same time the specification also states that the Q value may be regarded as an indicator of adhesion of the electrode to the polymer electrolyte membrane.

Further contradiction of what the value Q means appears to be in paragraph 42 which states:

> "the Q value is defined as the amount of electric charge per a unit area of the membrane electrode assembly, indicating that the larger the Q value, the higher the adhesion of the electrode 100 to the polymer electrolyte membrane 101".

Finally, paragraph 135 of the specification states that the Q value of each membrane assembly was measured in a range from –0.1 V to +0.7V .

Thus, it is unclear to the Examiner how the polymer electrolyte membrane can be characterized by a Q value that appears to be arbitrarily defined by applicant.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 5-9, and 16-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In independent claims 5, 16, 18 and 25, the limitation "said polymer electrolyte membrane having a softening point of 120 °C or more and a Q value of 0.09-0.18 C/cm^{2}" is not enabled by the specification. The specification does not provide any guidance on how to make a polymer electrolyte membrane with a certain Q value.

Claims depending from claims rejected under 35 USC 112, first paragraph are also rejected for the same.

5. Claims 18-22 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 18, the limitation "measurement being conducted at 85 °C" is not in the original disclosure.

Claims depending from claims rejected under 35 USC 112, first paragraph are also rejected for the same.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 5-10, and 16-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In independent claims 5, 16, 18, 25 the limitation "said polymer electrolyte membrane having a softening point of 120 ˚C or more and a Q value of 0.09-0:18 C/cm^2" is indefinite because it is unclear to the Examiner what the Q value means since there appears to be contradictions throughout the specification and it is a term not known to one of ordinary skill in the art to characterize a polymer electrolyte membrane or a membrane electrode assembly by a Q value.

However, the Q value as defined in the claims is determined from parameters external to the polymer electrolyte membrane and the Q value would vary depending on what the values of the external parameters are such that Q value is not an inherent property of the polymer electrolyte membrane itself.

The Q value claimed is not a property of the polymer electrolyte membrane but the Q value of the membrane electrode assembly with an electrode on only one side of the polymer electrolyte membrane that depends on a variety of factors such as the degree of adhesion of the electrode to the polymer electrolyte membrane (as stated by applicant in his specification), the temperature of the measurement, the concentration of catalyst on the electrode, the degree of ion exchange capacity of the polymer electrolyte membrane, and the operating current density of the membrane electrode assembly in the fuel cell (such as the ramping voltage used to measure the Q value).

As evidenced by the specification, paragraph 39 of the corresponding PG Publication US 2002/0155340 A1 states:

"Q may be regarded as an indicator of adhesion of the electrode to the polymer electrolyte membrane, and it has been found that with the Q value of 0.09-0.18 C/cm^2, an excellent polymer electrolyte membrane electrode assembly is obtained."

Paragraph 42 of the specification also states:

"In the discharge curve shown in Fig. 3, the Q value is defined as the amount of electric charge per a unit area of the membrane electrode assembly, indicating that the larger the Q value, the higher the adhesion of the electrode 100 to the polymer electrolyte membrane 101."

As also shown in Table 3 on page 36 of the specification, the Q value is affected by the pressure used in the hot-pressing step as illustrated by Examples 14 and 15 and these examples clearly show that the Q value is a measure of adhesion of the electrode to the polymer electrolyte membrane.

The value Q depends on a variety of conditions such as catalyst loading, degree of adhesion of the electrode to the catalyst layer, the temperature of the measurement, the operating current density of the membrane electrode assembly in the fuel cell and the degree of adhesion of the electrode to the polymer electrolyte membrane and it is not a property of the polymer electrolyte membrane. Furthermore, there is no recognition in the art using the value Q as defined by applicant to characterize the polymer electrolyte membrane in a membrane electrode assembly.

Thus, it is clear from the specification that the Q value is not an inherent property of the polymer electrolyte membrane. Therefore, the limitation "a polymer electrolyte membrane having a softening point of 120 °C or more and a Q value of 0.09-0.18 C/cm^2" is indefinite.

The arguments presented for the Q value are not commensurate in scope with what is claimed. What is claimed is the Q value of the polymer electrolyte membrane.

In claim 5, the limitation "a polymer electrolyte membrane electrode assembly comprising a polymer electrolyte membrane and an electrode formed on only one surface of the membrane" is indefinite because it is unclear if the polymer electrolyte membrane in the polymer electrolyte membrane electrode assembly is the same polymer electrolyte membrane in the membrane electrode assembly in the claim preamble.

In claim 18, the limitation "a polymer electrolyte membrane electrode assembly comprising a polymer electrolyte membrane having a thickness of about 20-60 μm" is indefinite because it is unclear if the polymer electrolyte membrane having a thickness of about 20-60 μm is the same polymer electrolyte membrane of the membrane electrode assembly recited in the preamble.

In claims 10, 16, 23, 24, 27 the limitation "wherein said polymer electrolyte membrane is made of a sulfonated hydrocarbon polymer that may contain oxygen in its skeleton or other substituent groups than a sulfonic group" is indefinite because it is unclear what other substituent groups are.

Furthermore, it is unclear how a sulfonated hydrocarbon polymer containing a sulfonic group (which is a side chain) be characterized as containing oxygen in its skeleton. It is also unclear what is the skeleton of a polymer.

Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 4, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Spiewak et al. (US Pat. No. 6,136,412).

Spiewak et al. disclose a membrane electrode assembly wherein the catalyst material is applied to the surface of the polymer electrolyte membrane and the catalyst support particles are localized within 2 microns of the ion conductive membrane (polymer electrolyte membrane) (See col. 2, lines 57-67; col. 3, lines 30-61; col. 7, lines 20-30; col. 8, lines 4-35; col. 15, lines 49-55; col. 16, lines 23-26; col. 20, lines 48-61; col. 21, lines 42-54 of the reference). Figures 2 and 3 of the reference show that some of the catalyst support particles are wholly embedded in the membrane or partially embedded (col. 8, lines 4-44). The catalyst electrodes are incorporated into very thin surface layers on either side of the ion conductive membrane and the catalyst electrode

particles are in incomplete contact with the polymer electrolyte membrane or ion conductive membrane (col. 7, lines 20-30). The thin electrode layers of the membrane electrode assembly can also be imparted with microtextures having feature sized in the 1 to 50 micron range, that is, smaller than the membrane thickness but larger than the catalyst support particle so that the catalyzed membrane surface is also replicated with these microtextures (col. 20, lines 48-67). The thickness of the catalyzed surface region of the polymer electrolyte membrane (ICM) can be 2 microns or less (col. 21, lines 40-55).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1, 4, 12 , 25-27 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Swathirajan et al. (US Pat. No. 5,272,017).

Swathirajan et al. disclose a membrane electrode assembly comprising a pair of opposing electrodes each having a catalytic layer, and a polymer electrolyte membrane sandwiched by the electrodes (see Abstract; Figure 2; col. 2, lines 3-30; col. 4, lines 42-50; col. 7, lines 30-42 of the reference).

Swathirajan at column 2, lines 3-30 specifically discloses that the catalyst slurry is heated while being pressed to the membrane for a time and at a temperature and compressive loading sufficient to soften the membrane and at least partially embed at least a portion of the catalyst particles in the membrane. It is noted that the method disclosed in Swathirajan in making the membrane electrode assembly (col. 2, lines 51-65) is identical to that disclosed by the instant specification such that the claimed properties of the membrane electrode assembly in the instant claims are inherent in the membrane electrode assembly of Swathirajan.

Swathirajan et al. disclose that the step of hot pressing is conducted at about 1,000 to about 2,000 pounds per square inch for about 1 to about 5 minutes at a temperature of about 120 °C to about 150 °C (col. 2, lines 50-57). The pressure range of about 1,000 to about 2,000 pounds per square inch is equivalent to 6.9 to 13.8 MPa. Paragraph 80 of the present applicants' instant specification states that the hot pressing conditions are in general preferably a temperature of 60-200 °C and a pressure of 1-10 MPa for about 1-5 minutes.

The court has held that claiming of a property or characteristic which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See also MPEP 2112 and 2112.01. When the Examiner has provided a sound basis for believing that the products of the applicant and the prior art are the same, the burden of proof is shifted to the applicant to prove that the product shown in the prior art does not possess the

characteristics of the claimed product. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

12. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spiewak et al. (US Pat. No. 6,136,412) in view of Helmer-Metzmann et al. (US Pat. No. 6,096,856).

Spiewak et al. (US Pat. No. 6,136,412) disclose all the limitations of claim 10 (see above) except that the sulfonated hydrocarbon polymer is sulfonated polyphenylene sulfide. Spiewak et al. do disclose the use of sulfonated hydrocarbon polymer as the ion-exchange resin in the membrane of the membrane electrode assembly (col. 16, lines 23-26).

Helmer-Metzmann et al. teach the use of sulfonated polyphenylene sulfide electrolyte membranes that are very resistant to heat and chemicals and that the membrane is advantageously employed in fuel cells (col. 1, lines 45-67; col. 3, lines 9-38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use sulfonated polyphenylene sulfide as the ion exchange resin membrane in the membrane electrode assembly (MEA) of Spiewak et al. because sulfonated polyphenylene sulfide would be very resistant to heat and chemical when used in the membrane electrode assembly of a fuel cell as compared to using NAFION which is not as thermally or chemically as stable as sulfonated polyphenylene sulfide at high operating temperatures of the fuel cell.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swathirajan et al. (US Pat. No. 5,272,017) in view of Helmer-Metzmann et al. (US Pat. No. 6,096,856).

Swathirajan et al. (US Pat. No. 5,272,017) disclose all the limitations of claim 10 above except that the sulfonated hydrocarbon polymer is sulfonated polyphenylene sulfide. Swathirajan et al. do disclose NAFION as the ion exchange resin in the membrane (col. 4, lines 42-50).

Helmer-Metzmann et al. teach the use of sulfonated polyphenylene sulfide electrolyte membranes that are very resistant to heat and chemicals and that the membrane is advantageously employed in fuel cells (col. 1, lines 45-67; col. 3, lines 9-38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use sulfonated polyphenylene sulfide as the ion exchange resin membrane in the membrane electrode assembly (MEA) of Swathirajan et al. because sulfonated polyphenylene sulfide would be very resistant to heat and chemical when used in the membrane electrode assembly of a fuel cell as compared to using NAFION which is not as thermally or chemically as stable as sulfonated polyphenylene sulfide at high operating temperatures of the fuel cell.

Response to Arguments

14. Applicant's arguments filed on 1/9/06 have been fully considered but they are not persuasive.

With respect to applicants' assertions that the remarks filed on 1/10/2005 make it abundantly clear that the Q value is specific to the polymer electrolyte membrane, not to the membrane electrode assembly, and accordingly, applicants submit that the changes they have made with the specification in no matter can be seen to reflect new matter.

In response, the Examiner has provided abundant evidence in the present and previous office actions that the Q value is not specific to the polymer electrolyte membrane as reiterated in the paragraphs above. The Q value is determined by parameters external to the polymer electrolyte membrane and depends on the degree of adhesion of the electrode to the polymer electrolyte membrane. Therefore, the amendments made to the specification as stated above constitute new matter. Furthermore as discussed in the previous office actions, the original specification as filed contains inconsistent statements regarding the Q value for the polymer electrolyte membrane and the Q value for the membrane electrode assembly. An analysis of the manner in which the Q value is obtained shows that the Q value is not inherent to the polymer electrolyte membrane for reasons discussed above. Finally, the Q value is not an art recognized property for the polymer electrolyte membrane.

With respect to arguments filed on 6/20/2005, the arguments presented on pages 10-14 of the amendment for the Q value are not commensurate in scope with what is

claimed. What is claimed is the Q value of the polymer electrolyte membrane. Applicants state on page 10 of the remarks:

"The Q value is principally the amount of electric charge per a unit area determined by contacting an electrode side to a nitrogen as gas in a cell in which the electrode is disposed on one side surface of a polymer electrode membrane and the other side surface of said polymer electrode membrane is surrounded by an aqueous sulfuric acid solution of pH1. The Q value is also a parameter which shows the adhesion of an interface between a catalytic electrode and a polymer electrolyte membrane in the membrane electrode assembly."

Page 11 of the applicants' remarks also states:

"Therefore, the most important factor influencing the Q value is the degree of adhesion between a catalytic electrode and a polymer electrolyte membrane in the membrane electrode assembly. As shown in Reference Fig. 1, in a state of poor adhesion therebetween, a peak is hardly observed with the CV curve."

The statement on page 11 of applicants' remarks supports the Examiner's position that the Q value is not an inherent property of the polymer electrolyte membrane.

Applicants state on page 12 of the remarks filed on 6/20/2005 that with respect to how one of ordinary skill in the art would know how to make a polymer having a Q value which would fall in the claims, the Examiner is requested to note that commercially available products can be used and quite clearly, one of ordinary skill in the art would be able to synthesize polymers of a similar nature and subject such polymers to Q value testing and that the exact

polymer used in the polymer electrolyte membrane assembly of the present invention is not overly important so long as it meets the criteria set forth in the present specification.

In response, the applicants did not set forth the temperature in the specification as originally filed at which the Q value is to be measured contrary to the detailed procedure set forth in the remarks filed on 6/20/2005 for determining the Q value at a certain temperature. This specific argument is unpersuasive since it clearly indicates that the Q value is not an inherent property of the polymer so it is unclear how one of ordinary skill in the art would know how to make a polymer having a certain Q value without undue experimentation.

Applicants also state that how various materials are laminate during Q value testing is not believed to be an overly important factor in determining the Q value.

In response, the Examiner is not persuaded by this argument since applicants state on page 11 of the same paper that the most important factor influencing the Q value is the degree of adhesion between a catalytic electrode and a polymer electrolyte membrane in the membrane electrode assembly and this important factor would clearly be influenced by the manner in which the lamination is carried out during Q value testing.

With respect to art rejections based on Swathirajan et al., applicant asserts that Swathirajan et al. do not teach or suggest any projection of the catalyst layer and any distance along the interface.

In response, the Examiner stated in the previous office and herein that Swathirajan et al. employ a similar, if not identical method of hot pressing the electrode onto the polymer electrolyte membrane which would result in these same distance along the interface. Swathirajan et al. disclose that the step of hot pressing is conducted at about 1,000 to about 2,000 pounds per square inch for about 1 to about 5 minutes at a temperature of about 120 °C to about 150 °C (col. 2, lines 50-57). The pressure range of about 1,000 to about 2,000 pounds per square inch is equivalent to 6.9 to 13.8 MPa. Paragraph 80 of applicant's specification states that the hot pressing conditions are in general preferably a temperature of 60-200 °C and a pressure of 1-10 MPa for about 1-5 minutes.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela J. Martin whose telephone number is 571-272-1288. The examiner can normally be reached on Monday-Friday from 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AJM

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER